

## WHAT IS CLAIMED IS:

1. An electronic control apparatus which incorporates a floating-point arithmetic function and performs various types of calculation and control operations in accordance  
5 with a predetermined computer program, comprising  
conversion means for operating on map data that comprise a set of map points and a set of map values respectively corresponding to said map points, to convert at least one of said set of map points and set of map  
10 values from fixed-point representation to floating-point representation.
2. An electronic control apparatus according to claim 1, wherein said map points are expressed in floating-point  
15 representation in said map data and said map values are expressed in fixed-point representation in said map data, and wherein data expressing said set of map values are of smaller amount than data which express said set of map points.
- 20 3. An electronic control apparatus according to claim 1, wherein said map points are expressed in fixed-point representation in said map data and said map values are expressed in floating-point representation in said map data,  
25 and wherein data expressing said set of map values are of

greater amount than data which express said set of map points.

4. An electronic control apparatus according to claim 1,  
5 wherein said map data and said map values are both expressed in fixed-point representation in said map data, and wherein said conversion means performs conversion of both said map points and said map values from fixed-point representation to floating-point representation.

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5. An electronic control apparatus according to claim 3 wherein said map values indirectly express respective physical quantity values, and comprising means for providing a LSB conversion value that is expressed in  
15 floating-point representation and represents a physical quantity value that has been predetermined as corresponding to a least significant bit of said fixed-point representation data, wherein

said map conversion means generates floating-point  
20 data expressing a value of a physical quantity corresponding to an interpolated value of said map values by using said data converted to floating-point representation in conjunction with said LSB conversion value.

6. An electronic control apparatus according to claim 5 wherein said conversion means derives said floating-point representation value of a physical quantity corresponding to an interpolated value of said map values, by  
5 successively  
operating on said converted floating-point representation data expressing said map values to calculate an interpolated value of said map values, and  
using said LSB conversion value to operate on said  
10 interpolated value, to obtain said physical quantity value corresponding to said interpolated value.

7. An electronic control apparatus according to claim 6 comprising means for providing data expressing an offset  
15 value that has been predetermined as corresponding to said map data, wherein said interpolated value is obtained as a logical value, and wherein conversion means  
operates on said logical value with said LSB conversion value, to obtain a provisional value of said  
20 physical quantity corresponding to said interpolated value, and  
adds said offset value to said provisional value, to obtain said floating-point representation value of a physical quantity corresponding to said interpolated value.

8. An electronic control apparatus according to claim 3, comprising means for providing a LSB conversion value that is expressed in floating-point representation and represents a physical quantity value that has been  
5 predetermined as corresponding to a least significant bit of said fixed-point representation data, wherein said conversion means utilizes said LSB conversion value and said map value data converted to floating-point representation to obtain a physical quantity value  
10 corresponding to said map point data and expressed in floating-point representation.

9. An electronic control apparatus according to claim 8, comprising means for providing data expressing an offset  
15 value that has been predetermined as corresponding to said map data, wherein said conversion means obtains said interpolated value as a logical value, and wherein conversion means

operates on said interpolated value with said LSB  
20 conversion value, to obtain a provisional value of said physical quantity corresponding to said interpolated value, and

adds said offset value to said provisional value, to obtain said floating-point representation value of a  
25 physical quantity corresponding to said interpolated value.

10. An electronic control apparatus according to claim 1,  
comprising means for providing ID data which express a type  
of said fixed-point representation data, wherein said  
5 conversion means performs conversion of said floating-point  
representation data to said fixed-point representation data  
based on said ID data.

11. An electronic control apparatus according to claim 1,  
10 wherein said conversion means executes said conversion by  
using a program that is written in assembler language.

12. An electronic control apparatus according to claim 1,  
comprising  
15 means for providing ID (identifier) data which have  
been predetermined as corresponding to said map data and  
which indicate whether or not both said map points and said  
map values of said map data are expressed in floating-point  
representation, and

20 means for inhibiting said conversion operation of said  
conversion means when said ID data indicate that both said  
map points and said map values are expressed in floating-  
point representation.

13. A memory apparatus for an electronic control apparatus,  
said electronic control apparatus executing various types  
of calculation and control processing in accordance with a  
predetermined program and having a floating-point  
5 arithmetic function, and said memory apparatus having  
stored therein map data which are used in floating-point  
calculations,

wherein said map data include a set of map points and  
a set of map values that respectively correspond to said  
10 map points, with at least one of said set of map points and  
said set of map values being expressed by fixed-point  
representation data, and wherein said memory apparatus has  
stored therein, in conjunction with said map data, a LSB  
conversion value that is expressed in floating-point  
15 representation and represents a physical quantity value  
that has been predetermined as corresponding to a least  
significant bit of said fixed-point representation data.

14. A memory apparatus for an electronic control apparatus  
20 according to claim 13 wherein said memory apparatus has  
stored therein, in conjunction with said map data, an  
offset value that is a difference between a physical  
quantity value and a value that has been generated by  
converting said fixed-point representation data to  
25 floating-point representation data and using said LSB

conversion value to operate on a result of an interpolation calculation performed on said converted floating-point representation data.

- 5 15. A memory apparatus for an electronic control apparatus according to claim 13, wherein said memory apparatus has stored therein, in conjunction with said map data, ID (identifier) data indicative of a type of said fixed-point representation data.

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16. A memory apparatus for an electronic control apparatus according to claim 13, wherein said memory apparatus has stored therein said map data with both said map points and said map values being expressed by floating-point  
15 representation data and further has stored therein, in conjunction with said map data, ID (identifier) data indicative of the condition that said map points and map values are both expressed in floating-point representation data.